

Claims

[c1] A method for recovering fines from a light FCC-type effluent gas, comprising the steps of:

- (a) supplying quench oil to a quench oil inventory to maintain the inventory in steady state;
- (b) contacting the effluent gas with the quench oil to cool the effluent gas and wash out catalyst fines to obtain a cooled effluent gas essentially free of fines;
- (c) returning the quench oil from the contacting step to the inventory;
- (d) continuously recirculating quench oil from the inventory to the contacting step;
- (e) continuously separating fines from a stream of the quench oil from the inventory to recover fines and keep the fines from building up in the inventory; and
- (f) slurring the fines recovered from the separation step.

[c2] The method of claim 1 wherein the contacting and collecting steps are effected in a quench tower comprising vapor-liquid contact elements and a bottoms zone holding the inventory.

[c3] The method of claim 1 further comprising cooling the recirculated quench oil before the contacting step.

[c4] The method of claim 1 wherein the separation step comprises filtration.

[c5] The method of claim 4 wherein the stream in the filtration step is continuously passed through a first filter in a filtration mode to separate the fines therefrom while a second filter in parallel with the first filter is in a backwashing mode to remove the separated fines therefrom.

[c6] The method of claim 5 wherein filtrate from the first filter is returned to the inventory.

[c7] The method of claim 5 wherein the backwashing of the at least one filter further comprises periodically alternating the first and second filters between the filtration and backwashing modes.

[c8] The method of claim 5 wherein the backwashing includes at least one compressed gas pulse through the second filter for fines removal.

[c9] The method of claim 5 further comprising collecting the fines from the backwashing step in a holdup vessel and adding a heavy oil to form a slurry.

[c10] The method of claim 9 wherein the heavy oil is a portion of the quench oil from the inventory.

[c11] The method of claim 9 further comprising introducing the slurry from the holdup vessel into a catalyst regenerator in a light FCC unit for combustion to regenerate and heat the catalyst.

[c12] The method of claim 11 wherein a rate of makeup quench oil is balanced with a rate of slurry introduced into the regenerator to keep a steady amount of quench oil in the inventory.

[c13] A system for recovering fines from a light FCC-type effluent gas, comprising:
means for continuously contacting the effluent gas with a heavy oil to cool the effluent gas and wash out the fines entrained therein to obtain a cooled effluent gas essentially free of entrained fines;
means for collecting the heavy oil from the contacting step in a liquid receiver;
means for continuously recirculating the heavy oil from the liquid receiver to the contacting step;
means for passing the heavy oil from the liquid receiver through at least one filter to remove fines from the heavy oil and collect the fines in the at least one filter;
means for at least periodically backwashing the at least one filter to remove the collected fines; and
means for producing a slurry rich in fines using the collected fines and a slurry oil selected from a second heavy oil, a portion of the heavy oil, and a combination thereof.

[c14] A system for recovering fines from a light FCC-type effluent gas, comprising:
a quench tower having an inlet for receiving the effluent gas, vapor-liquid

contacting elements disposed above the inlet for cooling the effluent gas and washing out the fines, a gas outlet above the contacting elements for discharging cooled effluent gas essentially free of entrained fines, and a liquid holdup zone below the inlet for collecting the quench oil from the contacting elements;

a recirculation loop for continuously recirculating the quench oil from the liquid holdup zone to the contacting elements;

at least two filters alternatingly operable in filtration and backwashing modes;

a filtration loop for circulating quench oil from the liquid holdup zone through a filtration-mode filter and returning filtrate to the liquid holdup zone; and

a backwashing loop for passing a compressed gas through a backwash-mode filter and introducing fines therefrom to a slurry collection zone.

[c15] The system of claim 14 further comprising a quench line for introducing the effluent gas into the inlet, the quench line including a mixing zone for receiving quench oil to cool the effluent gas, and a filtrate line from the filtration-mode filter to the mixing zone for supplying the filtrate as the quench oil.

[c16] The system of claim 14 further comprising a line for supplying makeup quench oil to the quench tower.

[c17] The system of claim 14 further comprising valves in the backwash and recirculation loop for selectively placing the filters in filtration and backwash modes.

[c18] The system of claim 14 further comprising a source of compressed gas, a line from the source to the backwashing loop, and a valve in the line for pulsing the compressed gas into the backwashing loop to facilitate fines removal from the backwashing-mode filter to the slurry collection zone.